



SEQUENCE LISTING

<110> Cahoon, Rebecca E.
Klein, Theodore M.
Odell, Joan T.
Orozco, Emil M. Jr.

<120> PLANT CELL CYCLIN GENES

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<141> 2000-09-19

<150> 60/078,735

<151> 1998-03-20

<150> PCT/US99/06047

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35 40 45

Ile Glu Ala Val Gln Ala Asp Val Thr Ala His Met Arg Ser Ile Leu
50 55 60

Val Asp Trp Leu Val Glu Val Ala Glu Glu Tyr Lys Leu Val Ala Asp
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 Thr Leu Tyr Leu Thr Ile Ser Tyr Val Asp Arg Phe Leu Ser Val Asn
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 Ala Leu Gly Arg Asp Lys Leu Gln Leu Leu Gly Val Ala Ser Met Leu
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 Ile Ala Ala Lys Phe Glu Glu Ile Ser Pro Pro His Pro Glu Asp Phe
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 Lys Gly Ser Ile Leu Leu Met Glu Phe Leu Gly Ser Tyr Leu Ala Glu
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 Ala Ala Ser Val Met Phe Val Ala Arg Pro Asp Ile Asp Pro Asn Thr
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 Asn Pro Trp Asn Thr Lys Leu Gln Lys Met Thr Gly Tyr Lys Val Ser
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 Glu Leu Lys Asp Cys Ile Val Ala Ile His Asp Leu Gln Leu Asn Arg
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 Lys Cys Pro Ser Leu Thr Ala Ile Arg Asp Lys Tyr Lys Gln His Lys
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Gly Glu Leu Pro Asn Leu Gln Asn Leu Ile Val Ser Glu Thr Gln Asn
35          40          45

Xaa Arg Lys Glu Lys Xaa Leu Cys Xaa Lys Asn Pro Asn Glu Lys Lys
50          55          60

Pro Ser Pro Thr Asn Asn Asn Thr Phe Pro Ser Pro Gln Ile Xaa Glu
65          70          75          80

Ser Tyr Asp Ser Asp Ile His Gly Tyr Leu Arg Glu Met Glu Met Gln
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Asn Lys Arg Arg Xaa Xaa Val Asp Thr Leu Lys Arg Leu Glu
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<213> Triticum aestivum

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35 40 45
Cys Ala Ser Tyr Ala Ala Glu Ile Tyr Arg Asn Leu Met Ala Ala Glu
50 55 60
Leu Ile Arg Arg Pro Lys Ser Asn Tyr Met Glu Thr Leu Gln Arg Asp
65 70 75 80
Ile Thr Lys Gly Met Arg Gly Ile Leu Ile Asp Trp Ala Leu Arg Phe
85 90 95
Leu Glu Glu Tyr Lys Leu Leu Pro Asp Thr Leu Tyr Leu Thr Val Tyr
100 105 110
Leu Ile Asp Gln Phe Leu Ser Arg Lys Tyr Ile Glu Arg Gln Lys Leu
115 120 125
Gln Leu Leu Gly Ile Thr Ser Met Leu Ile Ala Ser Lys Tyr Glu Glu
130 135 140
Ile Cys Ala Pro Arg Val Glu Glu Phe Cys Phe Ile Thr Asp Asn Thr
145 150 155 160
Tyr Thr Lys Asn Gln Val Leu Lys Met Glu Cys Glu Val Leu Asn Asp
165 170 175
Leu Gly Phe His Leu Ser Val Pro Thr Ile Lys Thr Phe Leu Arg Arg
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Gly Tyr Leu
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<213> Zea mays

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35 40 45

Val Val Asp Gln Asp Glu Glu Tyr Val Ala Leu Leu Ser Lys Glu
50 55 60

Ser Ala Ser Gly Gly Gly Pro Val Glu Glu Met Glu Asp Trp Met
65 70 75 80

Lys Ala Ala Arg Ser Gly Cys Val Arg Trp Ile Ile Lys Thr Thr Ala
85 90 95

Met Phe Arg Phe Gly Gly Lys Thr Ala Tyr Val Ala Val Asn Tyr Leu

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Glu His His Ala Pro Arg Leu Ser Glu Phe Pro Leu Asp Ala Cys Glu		
145	150	155
Phe Ala Phe Asp Ser Ala Ser Ile Leu Arg Met Glu Leu Leu Val Leu		
165	170	175
Gly Thr Leu Glu Trp Arg Met Ile Ala Val Thr Pro Phe Pro Tyr Ile		
180	185	190
Ser Tyr Phe Ala Ala Arg Phe Arg Glu Thr Ser Ala Gly Arg Ile Leu		
195	200	205
Met Arg Ala Val Glu Cys Val Phe Ala Ala Ile Lys Val Ile Ser Ser		
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Val Glu Xaa Arg Pro Ser Thr Ile Ala Val Ala Ser Ile Leu		
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Asp Arg Phe Leu Ala Arg Arg Cys Val Asp Arg Asp Lys Glu Trp Ala		
35	40	45

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 65 70 75 80
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 85 90 95
 Trp Gln Met Ile Thr Glu Thr Pro Phe Ser Tyr Leu Asn Cys Phe Thr
 100 105 110
 Ala Lys Phe Arg His Asp Glu Arg Lys Ala Ile Val Leu Arg Ala Ile
 115 120 125
 Glu Cys Ile Phe Ala Ser Ile Lys Val Ile Ser Ser Val Gly Tyr Gln
 130 135 140
 Pro Ser Thr Ile Ala Leu Ala Ala Ile Leu Ile Ala Arg Asn Lys Glu
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35 40 45

Pro Pro Pro Pro Ser Pro Thr Thr Glu Asp Cys Tyr Ser Ile Ala Ser
50 55 60

Phe Ile Glu His Glu Arg Asn Phe Val Pro Gly Phe Glu Tyr Leu Ser
65 70 75 80

Arg Phe Gln Ser Arg Ser Leu Asp Ala Asn Ala Arg Glu Glu Ser Val
85 90 95

Gly Trp Ile Leu Lys Val His Ala Tyr Tyr Gly Phe Gln Pro Leu Thr
100 105 110

Ala Tyr Leu Ala Val Asn Tyr Met Asp Arg Phe Leu Asp Ser Arg Arg
115 120 125

Leu Pro Glu Thr Asn Gly Trp Pro Leu Gln Leu Val Ser Val Ala Cys
130 135 140

Leu Ser Leu Ala Ala Lys Met Glu Glu Pro Leu Val Pro Ser Leu Leu
145 150 155 160

Asp Leu Gln Ile Glu Gly Ala Lys Tyr Ile Phe Glu Pro Arg Thr Ile
165 170 175

Arg Arg Met Glu Leu Leu Val Leu Gly Val Leu Asp Trp Arg Leu Arg
180 185 190

Ser Val Thr Pro Leu Cys Phe Leu Ala Phe Phe Ala Cys Lys Val Asp
195 200 205

Ser Thr Gly Thr Phe Ile Arg Phe Leu Ile Ser Arg Ala Thr Glu Ile
210 215 220

Ile Val Ser Asn Ile Gln Glu Ala Ser Phe Leu Ala Tyr Trp Pro Ser
225 230 235 240

Cys Ile Ala Ala Ala Ile Leu Thr Ala Ala Asn Glu Ile Pro Asn
245 250 255

Trp Ser Val Val Lys Pro Glu Asn Ala Glu Ser Trp Cys Glu Gly Leu
260 265 270

Arg Lys Glu Lys Val Ile Gly Cys Tyr Gln Leu Met Gln Glu Leu Val
275 280 285

Ile Asn Asn Asn Gln Arg Lys Leu Pro Leu Leu Lys Val Leu Pro Gln
290 295 300

Leu Arg Val Thr Thr Arg Thr Arg Met Arg Ser Ser Thr Val Ser Ser
305 310 315 320

Phe Ser Ser Ser Ser Thr Ser Phe Ser Leu Ser Cys Lys Arg Arg
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<211> 318

<212> PRT

<213> Glycine max

<400> 14

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35 40 45

Ser Arg Ser Leu Asp Ala Ser Ala Arg Glu Glu Ser Val Ala Trp Ile
50 55 60

Leu Lys Val Gln Ala Tyr Tyr Ala Phe Gln Pro Val Thr Ala Tyr Leu
65 70 75 80

Ser Val Asn Tyr Leu Asp Arg Phe Leu Asn Ser Arg Pro Leu Pro Pro
85 90 95

Lys Thr Asn Gly Trp Pro Leu Gln Leu Leu Ser Val Ala Cys Leu Ser
100 105 110

Leu Ala Ala Lys Met Glu Glu Ser Leu Val Pro Ser Leu Leu Asp Leu
115 120 125

Gln Val Glu Gly Ala Lys Tyr Val Phe Glu Pro Lys Thr Ile Arg Arg
130 135 140

Met Glu Leu Leu Val Leu Gly Val Leu Asp Trp Arg Leu Arg Ser Val
145 150 155 160

Thr Pro Phe Ser Phe Leu Asp Phe Phe Ala Cys Lys Leu Asp Ser Thr
165 170 175

Gly Thr Phe Thr Gly Phe Leu Ile Ser Arg Ala Thr Gln Ile Ile Leu
180 185 190

Ser Asn Ile Gln Glu Ala Ser Phe Leu Ala Tyr Trp Pro Ser Cys Ile
195 200 205

Ala Ala Ala Ala Ile Leu His Ala Ala Asn Glu Ile Pro Asn Trp Ser
210 215 220

Leu Val Arg Pro Glu His Ala Glu Ser Trp Cys Glu Gly Leu Arg Lys
225 230 235 240

Glu Lys Ile Ile Gly Cys Tyr Gln Leu Met Gln Glu Leu Val Ile Asp
245 250 255

Asn Asn Gln Arg Lys Pro Pro Lys Val Leu Pro Gln Leu Arg Val Thr
260 265 270

Ile Ser Arg Pro Ile Met Arg Ser Ser Val Ser Ser Phe Leu Ala Ser
275 280 285

Ser Ser Ser Pro Ser Ser Ser Leu Ser Cys Arg Arg Arg Lys Leu
290 295 300

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305 310 315

<210> 15
<211> 570
<212> DNA
<213> Triticum aestivum

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<220>
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tccatTTGCC aaacatgatC tattgtgaa ttctgttctc cctgggttat tgtctaaatg 420
gagacacgTC ttttttcgt ggactggcgc tctgtatggacacagaata tgTTTgattc 480
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<210>  16
<211>  75
<212>  PRT
<213>  Triticum aestivum

<220>
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Lys Tyr Glu Glu Ile Trp Ala Pro Glu Val Asn Asp Phe Ile Leu Phe
20          25          30

Ser Asp Asn Thr Tyr Thr Arg Glu Gln Ile Leu Arg Met Glu Lys Ala
35          40          45

Ile Leu Asn Met Leu Glu Trp Asn Leu Thr Val Pro Thr Pro Tyr Val
50          55          60

Phe Leu Val Xaa Phe Ala Lys Ala Ala Ser Ser
65          70          75

<210>  17
<211>  1932
<212>  DNA
<213>  Zea mays

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<223>  n = A, C, G or T

<220>
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<223>  n = A, C, G or T

<220>
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<210> 18
<211> 388
<212> PRT
<213> Zea mays

<400> 18

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															30

Glu	Ala	Val	Gly	Arg	Arg	Ser	Gly	Arg	Ser	Pro	Gly	Tyr	Gly	Asp	Asp
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Phe	Gly	Ala	Asp	Leu	Phe	Pro	Pro	Gln	Ser	Glu	Glu	Cys	Val	Ala	Gly
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Leu	Val	Glu	Arg	Glu	Arg	Asp	His	Met	Pro	Gly	Pro	Cys	Tyr	Gly	Asp
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Arg	Leu	Arg	Gly	Gly	Gly	Cys	Leu	Cys	Val	Arg	Arg	Glu	Ala	Val	
															95

Asp	Trp	Ile	Trp	Lys	Ala	Tyr	Thr	His	His	Arg	Phe	Arg	Pro	Leu	Thr
															110

Ala	Tyr	Leu	Ala	Val	Asn	Tyr	Leu	Asp	Arg	Phe	Leu	Ser	Leu	Ser	Glu
															125

Val Pro Asp Cys Lys Asp Trp Met Thr Gln Leu Leu Ala Val Ala Cys
 130 135 140

Val Ser Leu Ala Ala Lys Met Glu Glu Thr Ala Val Pro Gln Cys Leu
 145 150 155 160

Asp Leu Gln Glu Val Gly Asp Ala Arg Tyr Val Phe Glu Ala Lys Thr
 165 170 175

Val Gln Arg Met Glu Leu Leu Val Leu Thr Thr Leu Asn Trp Arg Met
 180 185 190

His Ala Val Thr Pro Phe Ser Tyr Val Asp Tyr Phe Leu Asn Lys Leu
 195 200 205

Asn Asn Gly Gly Ser Thr Ala Pro Arg Ser Cys Trp Leu Leu Gln Ser
 210 215 220

Ala Glu Leu Ile Leu Arg Ala Ala Arg Gly Thr Gly Cys Val Gly Phe
 225 230 235 240

Arg Pro Ser Glu Ile Ala Ala Ala Val Ala Ala Ala Val Ala Gly Asp
 245 250 255

Val Asp Asp Ala Asp Gly Val Glu Asn Ala Cys Cys Ala His Val Asp
 260 265 270

Lys Glu Arg Val Leu Arg Cys Gln Glu Ala Ile Gly Ser Met Ala Ser
 275 280 285

Ser Ala Ala Ile Asp Asp Ala Thr Val Pro Pro Lys Ser Ala Arg Arg
 290 295 300

Arg Ser Ser Pro Val Pro Val Pro Gln Ser Pro Val Gly Val Leu Asp
 305 310 315 320

Ala Ala Pro Cys Leu Ser Tyr Arg Ser Glu Glu Ala Ala Thr Ala Thr
 325 330 335

Ala Thr Ala Thr Ser Ala Ala Ser His Gly Ala Pro Gly Ser Ser Ser
 340 345 350

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 385

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 <212> DNA
 <213> Oryza sativa

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<222> (475)
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aaggcntccg gnngcccaa ctccttcnct tccaaanctg nnngccccgn tttgnccct 480
t 481

<210> 20
<211> 110
<212> PRT
<213> Oryza sativa

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<222> (26)
<223> Xaa = ANY AMINO ACID

<220>
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<222> (40)
<223> Xaa = ANY AMINO ACID

<220>
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<222> (100)
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Pro Arg Leu Leu Ala Ile Ser Cys Leu Xaa Leu Ala Ala Lys Met Gln
20 25 30

Arg Ala Ala Ala Ile Ser Ala Xaa Asp Ile Gln Arg Gly Glu Glu Phe
35 40 45

Met Phe Asp Glu Ala Lys Ile Gln Arg Met Glu Gln Met Val Leu Asn
50 55 60

Ala Leu Glu Trp Arg Thr Arg Ser Val Thr Pro Leu Ala Phe Leu Gly
65 70 75 80

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Phe Phe Leu Ser Ala Trp Phe Pro Gln Ala Ala Ala Pro Gly Ala Ala
85 90 95

Arg Cys His Xaa Gly Arg Ala Val Glu Leu Leu Leu Arg Val
100 105 110

<210> 21
<211> 789
<212> DNA
<213> Triticum aestivum

<400> 21
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<210> 22
<211> 163
<212> PRT
<213> Triticum aestivum

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<222> (28)
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20 25 30

Ser Ala Phe Glu Ala Arg Thr Ile Lys Val Met Glu Leu Leu Val Phe
35 40 45

Ser Thr Leu Lys Trp Arg Met Gln Ala Val Thr Ala Cys Ser Phe Ile
50 55 60

Asp Tyr Phe Leu Cys Lys Phe Asn Asp His Asp Thr Pro Ser Met Leu
65 70 75 80

Ala Phe Ser Cys Ser Thr Asp Leu Ile Leu Ser Thr Thr Lys Xaa Ala

85	90	95
Asp Phe Leu Val Phe Arg His Ser Glu Ile Ala Gly Ser Val Ala Leu		
100	105	110
Pro Ser Phe Gly Glu His Lys Thr Ser Val Val Glu Met Ala Thr Thr		
115	120	125
Asn Cys Lys Tyr Ile Asn Lys Gly Val Xaa Cys Asp Arg Lys Asp Pro		
130	135	140
Asp Glu Val Leu Pro Leu Trp Asn Ala Tyr Leu Lys Phe Gly Leu Arg		
145	150	155
Asp Met Leu		

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<210> 23
<211> 1132
<212> DNA
<213> Zea mays

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<210> 24
 <211> 318
 <212> PRT
 <213> Zea mays

<400> 24
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 20 25 30

Arg Cys Phe Leu Pro Gly Gly Ala Leu Arg Leu Gly Asp Gln Pro Trp
 35 40 45

Met Ala Arg Leu Ala Ala Val Thr Cys Phe Ala Leu Ala Ala Lys Val
 50 55 60

Glu Glu Thr Arg Val Pro Pro Leu Leu Asp Leu Gln Leu Tyr Ala Ala
 65 70 75 80

Ala Asp Ala Ala Asp Pro Tyr Val Phe Glu Ala Lys Thr Val Arg Arg
 85 90 95

Met Glu Leu Leu Val Leu Ser Ala Leu Gly Trp Arg Met His Pro Val
 100 105 110

Thr Pro Phe Ser Tyr Leu Gln Pro Val Leu Ala Asp Ala Ala Thr Arg
 115 120 125

Leu Arg Ser Cys Glu Gly Val Leu Leu Ala Val Met Ala Asp Trp Arg
 130 135 140

Trp Pro Arg His Arg Pro Ser Ala Trp Ala Ala Ala Leu Leu Ile
 145 150 155 160

Thr Ala Ala Ala Gly Asp Gly Asp Gly Asp Gly Asp Thr Glu Leu
 165 170 175

Leu Ala Leu Ile Asn Ala Pro Glu Asp Lys Thr Ala Glu Cys Ala Lys
 180 185 190
 Ile Ile Ser Glu Val Thr Gly Met Ser Phe Leu Ala Cys Asp Val Gly
 195 200 205
 Val Ser Ala Gly Asn Lys Arg Lys His Ala Ala Ala Gln Leu Tyr Ser
 210 215 220
 Pro Pro Pro Ser Pro Ser Gly Val Ile Gly Ala Leu Ser Cys Phe Ser
 225 230 235 240
 Cys Glu Ser Ser Thr Ser Ala Thr Ala Met Ala Ala Ala Val Gly Pro
 245 250 255
 Trp Ala Pro Ser Ala Ser Val Ser Val Ser Ser Ser Pro Glu Pro Pro
 260 265 270
 Gly Arg Ala Pro Lys Arg Ala Ala Ala Ala Ser Ala Ser Ala Ser Ala
 275 280 285
 Ser Ala Gly Val Ala Pro Pro Val Gln Val Pro His Gln Leu Pro Pro
 290 295 300
 Asp Glu Glu Ser Arg Asp Ala Trp Pro Ser Thr Cys Ala Ala
 305 310 315

<210> 25
 <211> 674
 <212> DNA
 <213> Glycine max

<220>
 <221> unsure
 <222> (527)
 <223> n = A, C, G or T

<220>
 <221> unsure
 <222> (561)
 <223> n = A, C, G or T

<220>
 <221> unsure
 <222> (640) '
 <223> n = A, C, G or T

<220>
 <221> unsure
 <222> (643)
 <223> n = A, C, G or T

<400> 25
 cactcaactca ccccttcctt tctaactcct caaattgtgt gttctgagaa tggaaatgcc 60
 tccttctcca tcggggcatt ccgcactctc catcccataa aagtcccaga tccaaagatgg 120
 cttaccacca tcaaaaatcc cttttggaca ccctatactg ctccgaagag cattggatag 180
 gggagggtga atttgaccaa gcagaggagg agtacggtaa cagtaatagc aatagtagca 240
 gcaccttagt aaacaactcc cctgagtcct cccctcatt gttgctcgaa agcgacatgt 300
 ttgggacga acaagagttg gcatcgctgt tggagaaaaga acaacacaac ccactaagca 360
 cttgctgtct ccaaagcaac cctgccttgg agggtgctcg catagaagcc gtggagtgg 420
 ttctcaaagt aaacgcccac tactccttct ctgcctcact cgctgttctt gctgtcaact 480
 actttgaccg ttttctttc agcttccgct ttcagaatga cattaancca tggatgactc 540
 ggggtcgctg cctgcgttgc nctctccctc gctgccaag tggcgagac acacgttccc 600
 tttcttattt gacccttcaa caaagtggga ggaggagtt atnctttgtt ccaagccaaa 660
 gacgattaaa aaag 674

<210> 26
 <211> 186
 <212> PRT
 <213> Glycine max

<220>
 <221> UNSURE
 <222> (137)
 <223> Xaa = ANY AMINO ACID

<220>
 <221> UNSURE
 <222> (149)
 <223> Xaa = ANY AMINO ACID

<220>
 <221> UNSURE
 <222> (175)...(176)
 <223> Xaa = ANY AMINO ACID

<400> 26
 Met Ala Tyr His His Gln Lys Ser Leu Leu Asp Thr Leu Tyr Cys Ser
 1 5 10 15

Glu Glu His Trp Ile Gly Glu Gly Glu Phe Asp Gln Ala Glu Glu Glu
 20 25 30

Tyr Gly Asn Ser Asn Ser Asn Ser Ser Ser Thr Leu Val Asn Asn Ser
 35 40 45

Pro Glu Ser Ser Pro His Leu Leu Leu Glu Ser Asp Met Phe Trp Asp
 50 55 60

Glu Gln Glu Leu Ala Ser Leu Leu Glu Lys Glu Gln His Asn Pro Leu
 65 70 75 80

Ser Thr Cys Cys Leu Gln Ser Asn Pro Ala Leu Glu Gly Ala Arg Ile
 85 90 95

Glu Ala Val Glu Trp Ile Leu Lys Val Asn Ala His Tyr Ser Phe Ser
 100 105 110

Ala Leu Thr Ala Val Leu Ala Val Asn Tyr Phe Asp Arg Phe Leu Phe
 115 120 125

Ser Phe Arg Phe Gln Asn Asp Ile Xaa Pro Trp Met Thr Arg Gly Arg
 130 135 140

Cys Arg Arg Leu Xaa Leu Pro Arg Cys Gln Ser Gly Arg Asp Thr Arg
 145 150 155 160

Ser Leu Ser Tyr Leu Thr Leu Gln Gln Ser Gly Arg Arg Ser Xaa Xaa
 165 170 175

Phe Val Pro Ser Gln Arg Arg Leu Lys Lys
 180 185

<210> 27
 <211> 554
 <212> DNA
 <213> Glycine max

<400> 27
 ctccctttca cctttcttca tagcctacca cttttctgct ttcatctact ctcacttctc 60
 ttcacacact gagacacaca gagagagaaa aataaagggt gtgtatgggtg tcttactgag 120

tgttttcttt ttataatgaa caaagaactg cacaccctct tcttcaccga agaagaagat 180
 ggcaattcag caccacaatg accaactaga gcataatgaa aatgtctcat ctgtccttga 240
 tgccttac tgtacgaag gaaagtggaa agaggaagag gaggagaaag aagaagaaga 300
 agatgaaggt gaaaatgaaa gtgaagtgc aacaaacact gcaacttgct tttccctct 360
 gctcttggg gagaagact tggtctggaa agatgaggaa ctaaactcta tctttccaa 420
 agagaaggtt caacatgaag aagcctatgg tataacaatc tgaacagtga tgtgtataac 480
 aacaacaaca atactagtat ataatgtgat ttggctcttg ctctcagct cgtcggagcg 540
 tgatgatgct gaat 554

<210> 28
 <211> 94
 <212> PRT
 <213> Glycine max

<400> 28
 Met Ala Ile Gln His His Asn Asp Gln Leu Glu His Asn Glu Asn Val
 1 5 10 15
 Ser Ser Val Leu Asp Ala Leu Tyr Cys Asp Glu Gly Lys Trp Glu Glu
 20 25 30
 Glu Glu Glu Lys Glu Glu Glu Asp Glu Gly Glu Asn Glu Ser
 35 40 45
 Glu Val Thr Thr Asn Thr Ala Thr Cys Leu Phe Pro Leu Leu Leu
 50 55 60
 Glu Gln Asp Leu Phe Trp Glu Asp Glu Glu Leu Asn Ser Ile Phe Ser
 65 70 75 80
 Lys Glu Lys Val Gln His Glu Glu Ala Tyr Gly Ile Thr Ile
 85 90

<210> 29
 <211> 372
 <212> PRT
 <213> Catharanthus roseus

<400> 29
 Met Ala Asp Lys Glu Asn Cys Ile Arg Val Thr Arg Leu Ala Lys Lys
 1 5 10 15
 Arg Ala Val Glu Ala Met Ala Ala Ser Glu Gln Gln Arg Pro Ser Lys
 20 25 30
 Lys Arg Val Val Leu Gly Glu Leu Lys Asn Leu Ser Ser Asn Ile Ser
 35 40 45
 Ser Ile Gln Thr Tyr Asp Phe Ser Ser Gly Pro Gln Lys Gln Gln Lys
 50 55 60
 Asn Lys Asn Lys Arg Lys Ala Lys Glu Ser Leu Gly Phe Glu Val Lys
 65 70 75 80
 Glu Lys Lys Val Glu Glu Ala Gly Ile Asp Val Phe Ser Gln Ser Asp
 85 90 95
 Asp Pro Gln Met Cys Gly Ala Tyr Val Ser Asp Ile Tyr Glu Tyr Leu
 100 105 110
 His Lys Met Glu Met Glu Thr Lys Arg Arg Pro Leu Pro Asp Tyr Leu
 115 120 125
 Asp Lys Val Gln Lys Asp Val Thr Ala Asn Met Arg Gly Val Leu Ile
 130 135 140

Asp Trp Leu Val Glu Val Ala Glu Glu Tyr Lys Leu Leu Pro Asp Thr
 145 150 155 160
 Leu Tyr Leu Thr Val Ser Tyr Ile Asp Arg Phe Leu Ser Met Asn Ala
 165 170 175
 Leu Ser Arg Gln Lys Leu Gln Leu Leu Gly Val Ser Ser Met Leu Ile
 180 185 190
 Ala Ser Lys Tyr Glu Glu Ile Ser Pro Pro His Val Glu Asp Phe Cys
 195 200 205
 Tyr Ile Thr Asp Asn Thr Tyr Lys Lys Glu Glu Val Val Lys Met Glu
 210 215 220
 Ala Asp Val Leu Lys Phe Leu Lys Phe Glu Met Gly Asn Pro Thr Ile
 225 230 235 240
 Lys Thr Phe Leu Arg Arg Leu Thr Arg Val Val Gln Asp Gly Asp Lys
 245 250 255
 Asn Pro Asn Leu Gln Phe Glu Phe Leu Gly Tyr Tyr Leu Ala Glu Leu
 260 265 270
 Ser Leu Leu Asp Tyr Gly Cys Val Lys Phe Leu Pro Ser Leu Ile Ala
 275 280 285
 Ser Ser Val Ile Phe Leu Ser Arg Phe Thr Leu Gln Pro Lys Val His
 290 295 300
 Pro Trp Asn Ser Leu Leu Gln His Asn Ser Gly Tyr Lys Pro Ala Asp
 305 310 315 320
 Leu Lys Glu Cys Val Leu Ile Ile His Asp Leu Gln Leu Ser Lys Arg
 325 330 335
 Gly Ser Ser Leu Val Ala Val Arg Asp Lys Tyr Lys Gln His Lys Phe
 340 345 350
 Lys Cys Val Ser Thr Leu Thr Ala Pro Pro Ser Ile Pro Asp Glu Phe
 355 360 365
 Phe Glu Asp Ile
 370
 <210> 30
 <211> 335
 <212> PRT
 <213> Arabidopsis thaliana
 <400> 30
 Met Arg Ser Tyr Arg Phe Ser Asp Tyr Leu His Met Ser Val Ser Phe
 1 5 10 15
 Ser Asn Asp Met Asp Leu Phe Cys Gly Glu Asp Ser Gly Val Phe Ser
 20 25 30
 Gly Glu Ser Thr Val Asp Phe Ser Ser Ser Glu Val Asp Ser Trp Pro
 35 40 45
 Gly Asp Ser Ile Ala Cys Phe Ile Glu Asp Glu Arg His Phe Val Pro
 50 55 60
 Gly His Asp Tyr Leu Ser Arg Phe Gln Thr Arg Ser Leu Asp Ala Ser
 65 70 75 80

Ala Arg Glu Asp Ser Val Ala Trp Ile Leu Lys Val Gln Ala Tyr Tyr
 85 90 95

 Asn Phe Gln Pro Leu Thr Ala Tyr Leu Ala Val Asn Tyr Met Asp Arg
 100 105 110

 Phe Leu Tyr Ala Arg Arg Leu Pro Glu Thr Ser Gly Trp Pro Met Gln
 115 120 125

 Leu Leu Ala Val Ala Cys Leu Ser Leu Ala Ala Lys Met Glu Glu Ile
 130 135 140

 Leu Val Pro Ser Leu Phe Asp Phe Gln Val Ala Gly Val Lys Tyr Leu
 145 150 155 160

 Phe Glu Ala Lys Thr Ile Lys Arg Met Glu Leu Leu Val Leu Ser Val
 165 170 175

 Leu Asp Trp Arg Leu Arg Ser Val Thr Pro Phe Asp Phe Ile Ser Phe
 180 185 190

 Phe Ala Tyr Lys Ile Asp Pro Ser Gly Thr Phe Leu Gly Phe Phe Ile
 195 200 205

 Ser His Ala Thr Glu Ile Ile Leu Ser Asn Ile Lys Glu Ala Ser Phe
 210 215 220

 Leu Glu Tyr Trp Pro Ser Ser Ile Ala Ala Ala Ile Leu Cys Val
 225 230 235 240

 Ala Asn Glu Leu Pro Ser Leu Ser Ser Val Val Asn Pro His Glu Ser
 245 250 255

 Pro Glu Thr Trp Cys Asp Gly Leu Ser Lys Glu Lys Ile Val Arg Cys
 260 265 270

 Tyr Arg Leu Met Lys Ala Met Ala Ile Glu Asn Asn Arg Leu Asn Thr
 275 280 285

 Pro Lys Val Ile Ala Lys Leu Arg Val Ser Val Arg Ala Ser Ser Thr
 290 295 300

 Leu Thr Arg Pro Ser Asp Glu Ser Ser Ser Pro Cys Lys Arg Arg Lys
 305 310 315 320

 Leu Ser Gly Tyr Ser Trp Val Gly Asp Glu Thr Ser Thr Ser Asn
 325 330 335

 <210> 31
 <211> 354
 <212> PRT
 <213> Nicotiana tabacum

 <400> 31
 Met Ala Ala Asp Asn Ile Tyr Asp Phe Val Ala Ser Asn Leu Leu Cys
 1 5 10 15

 Thr Glu Thr Lys Ser Leu Cys Phe Asp Asp Val Asp Ser Leu Thr Ile
 20 25 30

 Ser Gln Gln Asn Ile Glu Thr Lys Ser Lys Asp Leu Ser Phe Asn Asn
 35 40 45

 Gly Ile Arg Ser Glu Pro Leu Ile Asp Leu Pro Ser Leu Ser Glu Glu
 50 55 60

Cys Leu Ser Phe Met Val Gln Arg Glu Met Glu Phe Leu Pro Lys Asp
 65 70 75 80

Asp Tyr Val Glu Arg Leu Arg Ser Gly Asp Leu Asp Leu Ser Val Arg
 85 90 95

Lys Glu Ala Leu Asp Trp Ile Leu Lys Ala His Met His Tyr Gly Phe
 100 105 110

Gly Glu Leu Ser Phe Cys Leu Ser Ile Asn Tyr Leu Asp Arg Phe Leu
 115 120 125

Ser Leu Tyr Glu Leu Pro Arg Ser Lys Thr Trp Thr Val Gln Leu Leu
 130 135 140

Ala Val Ala Cys Leu Ser Leu Ala Ala Lys Met Glu Glu Ile Asn Val
 145 150 155 160

Pro Leu Thr Val Asp Leu Gln Val Gly Asp Pro Lys Phe Val Phe Glu
 165 170 175

Gly Lys Thr Ile Gln Arg Met Glu Leu Leu Val Leu Ser Thr Leu Lys
 180 185 190

Trp Arg Met Gln Ala Tyr Thr Pro Tyr Thr Phe Ile Asp Tyr Phe Met
 195 200 205

Arg Lys Met Asn Gly Asp Gln Ile Pro Ser Arg Pro Leu Ile Ser Gly
 210 215 220

Ser Met Gln Leu Ile Leu Ser Ile Ile Arg Ser Ile Asp Phe Leu Glu
 225 230 235 240

Phe Arg Ser Ser Glu Ile Ala Ala Ser Val Ala Met Ser Val Ser Gly
 245 250 255

Glu Ile Gln Ala Lys Asp Ile Asp Lys Ala Met Pro Cys Phe Phe Ile
 260 265 270

His Leu Asp Lys Gly Arg Val Gln Lys Cys Val Glu Leu Ile Gln Asp
 275 280 285

Leu Thr Thr Ala Thr Ile Thr Thr Ala Ala Ala Ser Leu Val Pro
 290 295 300

Gln Ser Pro Ile Gly Val Leu Glu Ala Ala Ala Cys Leu Ser Tyr Lys
 305 310 315 320

Ser Gly Asp Glu Arg Thr Val Gly Ser Cys Thr Thr Ser Ser His Thr
 325 330 335

Lys Arg Arg Lys Leu Asp Thr Ser Ser Leu Glu His Gly Thr Ser Glu
 340 345 350

Lys Leu

<210> 32
<211> 373
<212> PRT
<213> Nicotiana tabacum

<400> 32
Met Ala Ile Glu His Asn Glu Gln Gln Glu Leu Ser Gln Ser Phe Leu
1 5 10 15

Leu Asp Ala Leu Tyr Cys Glu Glu Glu Glu Lys Trp Gly Asp Leu
 20 25 30

Val Asp Asp Glu Thr Ile Ile Thr Pro Leu Ser Ser Glu Val Thr Thr
 35 40 45

Thr Thr Thr Thr Thr Lys Pro Asn Ser Leu Leu Pro Leu Leu Leu
 50 55 60

Leu Glu Gln Asp Leu Phe Trp Glu Asp Glu Glu Leu Leu Ser Leu Phe
 65 70 75 80

Ser Lys Glu Lys Glu Thr His Cys Trp Phe Asn Ser Phe Gln Asp Asp
 85 90 95

Ser Leu Leu Cys Ser Ala Arg Val Asp Ser Val Glu Trp Ile Leu Lys
 100 105 110

Val Asn Gly Tyr Tyr Gly Phe Ser Ala Leu Thr Ala Val Leu Ala Ile
 115 120 125

Asn Tyr Phe Asp Arg Phe Leu Thr Ser Leu His Tyr Gln Lys Asp Lys
 130 135 140

Pro Trp Met Ile Gln Leu Ala Ala Val Thr Cys Leu Ser Leu Ala Ala
 145 150 155 160

Lys Val Glu Glu Thr Gln Val Pro Leu Leu Leu Asp Phe Gln Val Glu
 165 170 175

Asp Ala Lys Tyr Val Phe Glu Ala Lys Thr Ile Gln Arg Met Glu Leu
 180 185 190

Leu Val Leu Ser Ser Leu Lys Trp Arg Met Asn Pro Val Thr Pro Leu
 195 200 205

Ser Phe Leu Asp His Ile Ile Arg Arg Leu Gly Leu Arg Asn Asn Ile
 210 215 220

His Trp Glu Phe Leu Arg Arg Cys Glu Asn Leu Leu Leu Ser Ile Met
 225 230 235 240

Ala Asp Cys Arg Phe Val Arg Tyr Met Pro Ser Val Leu Ala Thr Ala
 245 250 255

Ile Met Leu His Val Ile His Gln Val Glu Pro Cys Asn Ser Val Asp
 260 265 270

Tyr Gln Asn Gln Leu Leu Gly Val Leu Lys Ile Asn Lys Glu Lys Val
 275 280 285

Asn Asn Cys Phe Glu Leu Ile Ser Glu Val Cys Ser Lys Pro Ile Ser
 290 295 300

His Lys Arg Lys Tyr Glu Asn Pro Ser His Ser Pro Ser Gly Val Ile
 305 310 315 320

Asp Pro Ile Tyr Ser Ser Glu Ser Ser Asn Asp Ser Trp Asp Leu Glu
 325 330 335

Ser Thr Ser Ser Tyr Phe Pro Val Phe Lys Lys Ser Arg Val Gln Glu
 340 345 350

Gln Gln Met Lys Leu Ala Ser Ser Ile Ser Arg Val Phe Val Glu Ala
 355 360 365

Val Gly Ser Pro His
370